

ADROK CASE STUDY – IDENTIFYING WATERTABLES IN SCOTLAND



GEOLOGICAL BACKGROUND

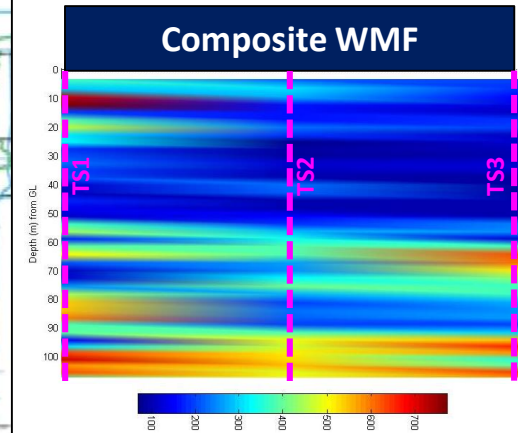
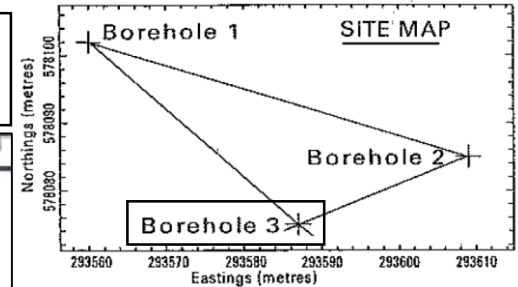
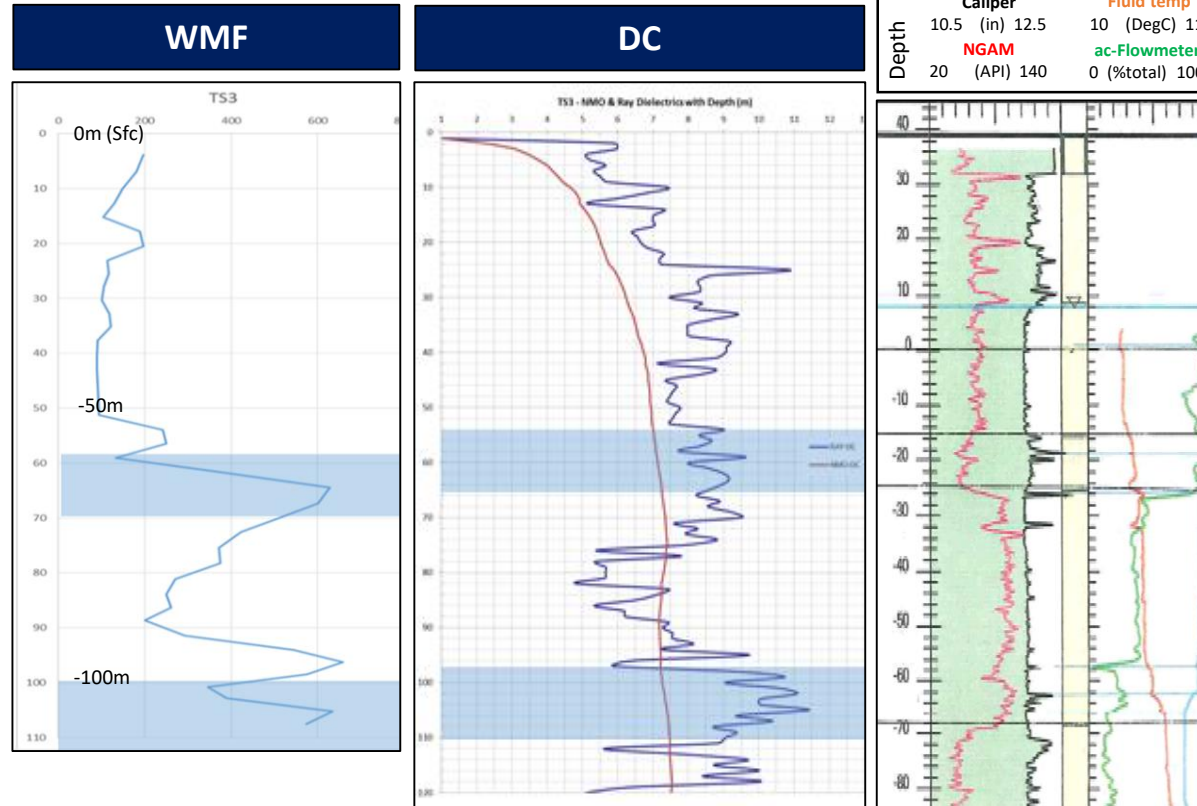
The Dumfries Basin aquifer is one of the most important groundwater resources available in Scotland. The aquifers are contained within the Permian Doweel Breccia and Locharbriggs Sandstone formations, present beneath much of Dumfries Basin and are the main aquifers for the region.

The Doweel formation has low intergranular permeability and porosity but has high secondary permeability in the form of fractures. Consequently, horizontal permeability is more prevalent than vertical permeability and therefore water is transported through naturally occurring horizontal fractures and interlayer breaks between sandstone and breccia units that exist throughout the basin, providing a high flow rate for water movement.

DEPTH OF AQUIFERS

According to the geological information provided by Scottish Water, the two main aquifers are located in multiple fractures between 58-68m and 98-110m. This meant that the aquifer was self-contained within in a less permeable geological unit, confining the water to thin fracture networks. This was useful to Adrok as it meant the difference between the Water rich fracture network and the enveloping non-permeable breccia would provide a stark contrast when analysis the results from its ADR scanner.

AIM: to demonstrate Adrok's ability to identify the presence of known water aquifers beneath the Terregles survey site and showcase Adrok's repeatability by correlating these aquifers across multiple V-bores.



High Dielectrics and peaks in the Weighted Mean Frequency could both be used to directly identify the location of the aquifers within the subsurface matched or closely matched with the fracture zones and therefore the aquifers at 58-68m and 98-110m with only an offset of about 1-2m.

Scottish Water provided downhole logs drilled directly beneath the survey site, specifically detailing subsurface water flow and saturation.

CORRELATION ACROSS SCANS
The colour shaded diagram shows a composite profile (WMF) of all three scans (TS1-TS3). Red highlights are higher values of WMF which correspond with water tables in TS3. The horizontal red zones can be interpreted as water table.